Trend Study 16C-33-04

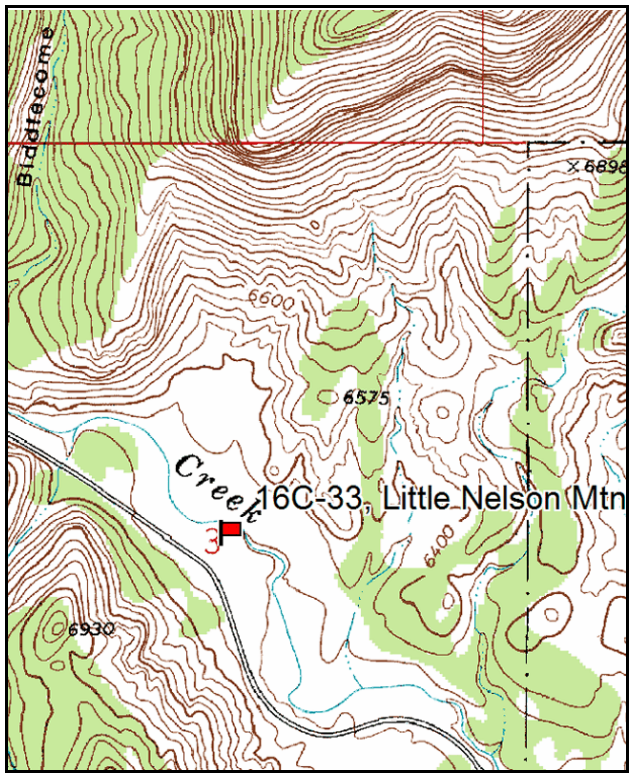
Study site name: Little Nelson Mountain . Vegetation type: Wyoming Big Sagebrush .

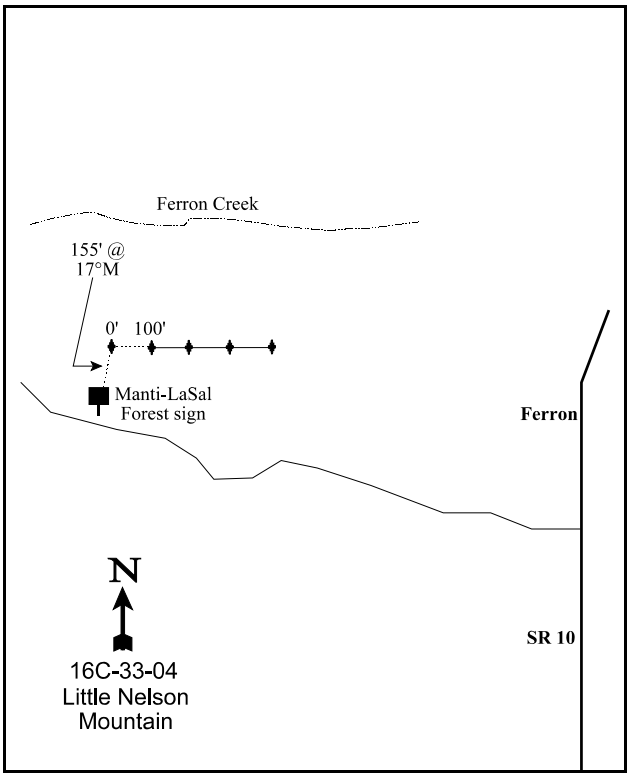
Compass bearing: frequency baseline 127 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Ferron, proceed up Ferron Canyon past Millsite State Park. Continue 0.7 miles past the forest boundary to the Manti-LaSal Forest sign. The 0-foot baseline stake is on the right hand side of the road approximately 155 feet away at a bearing of 17°M.





Map Name: Ferron

Diagrammatic Sketch

Township 20S , Range 6E , Section 3

GPS: NAD 27, UTM 12S 4328645 N, 479915 E

DISCUSSION

Little Nelson Mountain - Trend Study No. 16C-33

The Little Nelson Mountain study in Ferron Canyon was established in 1994. It samples a dry Wyoming big sagebrush site along the banks of Ferron creek, just up stream from Millsite reservoir. The terrain at the site gently slopes north toward the creek. Elevation is approximately 6,340 feet. The area receives concentrated use from wintering deer. Pellet group data from 1999 estimated 22 deer and 17 cow days use/acre (54 ddu/ha and 42 cdu/ha). All cattle pats were from the previous grazing season ('98). The site is within the Ferron allotment but is grazed only as cattle are trailed up the road to higher pastures. Pellet group data from 2004 show very light use, estimated at only 4 deer and 3 cattle days use/acre (10 ddu/ha and 7 cdu/ha).

The soils are alluvially deposited and deep with some river cobble on the surface and within the profile. Effective rooting depth is estimated at just over 26 inches. Texture is a loam with a slightly alkaline pH (7.6). Soil temperature is moderately high averaging 63°F in 2004 at an average depth of nearly 17 inches. Phosphorus is limited at only 3.5 ppm and potassium is marginal at 67.2 ppm. Phosphorus levels less than 10 ppm and potassium levels less than 70 ppm can limit normal plant growth and development. There is a considerable amount of exposed bare ground between individual shrubs. Percent bare ground was estimated at 52% in 1994 and 51% in 2004. Soil pedestaling is evident to a height of 4 to 6 inches in some areas. Herbaceous vegetation is marginal with grasses and forbs providing only 17% cover in 2004. The erosion condition class determined the soil to be stable in 2004. Most erosion in the area comes from high intensity thunderstorm events. One such event on the day following study site establishment in 1994, washed out the road just past the reservoir.

The key browse species on the site consists of a moderately dense population of Wyoming big sagebrush. Density was estimated at nearly 3,000 plants/acre in 1994, increasing slightly in 1999, but then dropping by 68% by 2004 to 1,100 plants/acre due to drought. Approximately 40% of the remaining sagebrush are decadent and 68% of the decadent plants sampled were classified as dying in 2004. However, mature plants numbering about 600 plants/acre are vigorous and producing excellent annual leader growth, averaging about 3 inches. Seed heads were also numerous, sagebrush seedlings were moderately abundant, but no young plants were sampled in 2004.

Shadscale is also abundant with an estimated population of 2,700 plants/acre in 1994 declining to 1,660 by 2004. Use of these small shrubs was primarily light to moderate. Several other shrubs occurred in small numbers.

The herbaceous understory is diverse and moderately abundant for this type of site. The most common grass is blue grama which accounted for 81% of the grass cover in 1994 and 76% in 1999. Other fairly common grasses include Indian ricegrass and bottlebrush squirreltail. Perennial forbs are diverse but when all are combined, account for less than one percent cover in 1994, increasing to 4% by 2004. The most abundant species include an Astragalus, hoary aster, and scarlet globemallow. Annual forbs, annual stickseed and wooly plantain, have increased in abundance and cover since 1994.

1994 APPARENT TREND ASSESSMENT

Protective ground cover is lacking on this site primarily due to the lack of herbaceous species. Percent bare ground is quite high and there are large areas of exposed soil. Pedestaling is evident and during high intensity rain events there is little protective cover to hold the soil in place. A return to normal precipitation patterns will improve the herbaceous cover on the site. The key browse consists of Wyoming big sagebrush. Apparent trend for these shrubs appears stable currently. There is an adequate number of seedlings and young to replace most of the dying plants. Percent decadency is low at 32% but utilization is fairly heavy. The herbaceous

understory is in poor condition. The dominant grass consists of the low growing blue grama. Forbs are scarce. The Desirable Components Index rated this site as fair with a score of 36 due to low shrub cover, high decadence, and moderate grass cover.

winter range condition (DC Index) - 36 (fair) Wyoming big sagebrush type

1999 TREND ASSESSMENT

Trend for soil is slightly up due to a decline in relative percent cover of bare ground from 58% to 39%. Litter cover remained about the same, while relative vegetative cover increased from 19% to 27%. Relative cryptogamic cover increased slightly as well. There is still a considerable amount of unprotected bare soil on the site and erosion continues to occur. Trend for the key species, Wyoming big sagebrush, is up slightly. Utilization is still moderate to heavy but vigor has improved, percent decadence has declined, and young recruitment is up. Shadscale, which is also abundant, appears to be stable. Trend for the herbaceous understory is slightly up as sum of nested frequency of perennial grasses has increased slightly while frequency of perennial forbs has increased substantially. However, perennial forbs only contribute 2% of the perennial herbaceous cover. Cover of both grasses and forbs has also increased since 1994. Blue gramma is stable and currently provides 76% of the grass cover and 60% of the total herbaceous cover. Indian ricegrass and bottlebrush squirreltail are also fairly abundant and combined they produce 18% of the grass cover. Indian ricegrass has increased significantly in sum of nested frequency since 1994, while bottlebrush squirreltail has remained stable. The Desirable Components Index rated this site as excellent with a score of 70 due to an increase in shrub cover, moderate decadence, many young shrubs, and good grass and forb cover.

TREND ASSESSMENT
soil - slightly up (4)
browse - up slightly (4)
herbaceous understory - slightly up (4)
winter range condition (DC Index) - 70 (excellent) Wyoming big sagebrush type

2004 TREND ASSESSMENT

Trend for soil is considered stable because the increase in relative bare soil is not enough to warrant a downward trend for soil. Some erosion is occurring but the erosion condition class was determined to be stable. Trend for the key browse species, Wyoming big sagebrush, is down. Density has declined from 3,480 down to 1,100 plants/acre, a 68% drop in the sagebrush population. About 40% of the remaining sagebrush were classified as decadent and 68% of the decadent plants were rated as dying. However, mature plants are vigorous and producing excellent leader growth averaging about 3 inches. No young plants were sampled but seedlings are moderately abundant and seed production is excellent. Density of shadscale declined 35% but the remaining population appears healthy. Trend for the herbaceous understory is stable because perennial grass nested frequency has not dropped enough to warrant a change in trend. Sum of nested frequency for perennial forbs has remained fairly stable. The most abundant perennial grass, the warm season blue grama, declined significantly in nested frequency and cover dropped four-fold from nearly 12% to only 3%. Nested frequency and cover for the cool season, Indian ricegrass and bottlebrush squirreltail, remained stable. Summer drought would effect blue grama more than the cool season species. The Desirable Components Index rated this site as fair with a score of 43 due to a slight decrease in shrub cover, moderate decadence, and a decrease in grass cover.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - stable (3)
winter range condition (DC Index) - 43 (fair) Wyoming big sagebrush type

HERBACEOUS TRENDS --
Management unit 16C, Study no: 33

Type	Species	Nested Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
G	Bouteloua gracilis	ab143	b160	a109	7.73	11.74	2.79
G	Bromus tectorum (a)	a-	b75	a7	-	.40	.02
G	Elymus salina	b18	a-	a-	.08	-	-
G	Hilaria jamesii	1	5	14	.00	.03	.59
G	Oryzopsis hymenoides	a57	b79	ab62	.86	1.37	1.34
G	Sitanion hystrix	78	70	57	.68	1.37	1.39
G	Sporobolus cryptandrus	12	43	37	.12	.52	.23
G	Stipa comata	a6	a1	b27	.03	.03	.79
Total for Annual Grasses		0	75	7	0	0.40	0.01
Total for Perennial Grasses		315	358	306	9.52	15.08	7.15
Total for Grasses		315	433	313	9.52	15.48	7.17
F	Astragalus consobrinus	a8	b91	b89	.02	.77	.96
F	Aster spp.	b15	a-	a-	.02	-	-
F	Calochortus nuttallii	-	-	2	-	-	.00
F	Castilleja spp.	1	-	1	.00	-	.00
F	Chenopodium fremontii (a)	-	-	10	-	-	.02
F	Cryptantha spp.	2	-	-	.00	-	-
F	Draba spp. (a)	a-	b25	a-	-	.07	-
F	Erigeron spp.	2	14	-	.00	.07	-
F	Eriogonum spp.	-	-	8	-	-	.02
F	Gilia spp. (a)	a-	a-	b75	-	-	.22
F	Halogeton glomeratus (a)	2	-	9	.00	-	.09
F	Lappula occidentalis (a)	a9	b46	c242	.02	.11	2.71
F	Lepidium densiflorum (a)	a-	a-	b17	-	-	.08
F	Malcolmia africana	-	-	2	-	-	.03
F	Machaeranthera canescens	a4	b36	a-	.01	1.70	-
F	Microsteris gracilis (a)	-	-	1	-	-	.00
F	Navarretia intertexta (a)	a-	a-	b51	-	-	.38
F	Plantago patagonica (a)	a32	b95	b110	.07	.91	2.69
F	Salsola iberica (a)	9	-	3	.01	-	.00

Type	Species	Nested Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
F	Sphaeralcea coccinea	$_{a}$13	$_{a}$11	$_{b}$42	.06	.10	2.13
F	Sphaeralcea grossulariaefolia	-	-	-	-	-	.03
F	Townsendia incana	$_{a}$15	$_{b}$47	$_{b}$45	.04	.31	.72
F	Unknown forb-perennial	4	-	-	.01	-	-
Total for Annual Forbs		52	166	518	0.11	1.09	6.22
Total for Perennial Forbs		64	199	189	0.18	2.96	3.91
Total for Forbs		116	365	707	0.29	4.05	10.13

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 16C, Study no: 33

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	0	1	0	-	-	-
B	Artemisia spinescens	1	3	0	-	.06	-
B	Artemisia tridentata wyomingensis	64	66	32	3.45	6.78	3.00
B	Atriplex canescens	0	0	0	.54	-	-
B	Atriplex confertifolia	50	53	44	1.08	3.03	4.65
B	Atriplex gardneri	-	-	-	.98	-	-
B	Ceratoides lanata	4	3	4	.00	.00	.33
B	Chrysothamnus nauseosus	3	0	0	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	3	8	0	.03	-	-
B	Eriogonum microthecum	1	0	0	.00	-	-
B	Gutierrezia sarothrae	0	0	1	-	-	-
B	Juniperus osteosperma	0	1	0	-	-	-
B	Leptodactylon pungens	3	6	0	.03	.15	-
B	Opuntia polyacantha	36	36	36	.84	1.57	.21
B	Sarcobatus vermiculatus	1	1	1	.38	.38	.66
B	Sclerocactus	0	4	2	-	.01	-
B	Tetradymia spinosa	0	2	0	-	-	-
Total for Browse		166	184	120	7.36	12.00	8.86

CANOPY COVER, LINE INTERCEPT --
Management unit 16C, Study no: 33

Species	Percent Cover '04
Artemisia tridentata wyomingensis	4.90
Atriplex confertifolia	3.00
Ceratoides lanata	.65
Opuntia polyacantha	.91

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 16C, Study no: 33

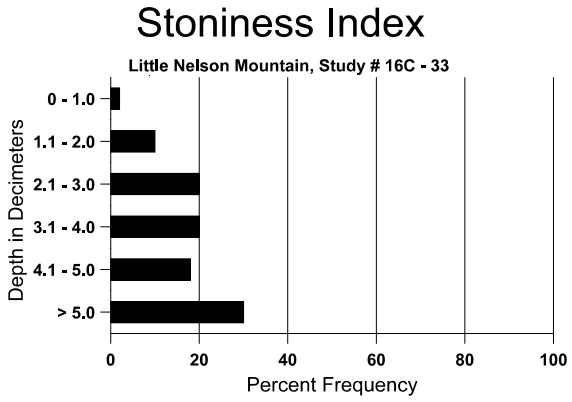
Species	Average leader growth (in) '04
Artemisia tridentata wyomingensis	2.9
Ceratoides lanata	5.9

BASIC COVER --
Management unit 16C, Study no: 33

Cover Type	Average Cover %		
	'94	'99	'04
Vegetation	16.88	30.04	25.68
Rock	3.92	4.51	2.88
Pavement	1.43	8.14	6.36
Litter	13.36	16.00	20.45
Cryptogams	2.23	9.79	2.85
Bare Ground	51.92	43.53	50.60

SOIL ANALYSIS DATA --
Management unit 16C, Study no: 33, Study Name: Little Nelson Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
26.1	63.0 (16.8)	7.6	48.0	33.4	18.6	1.5	3.5	67.2	0.6



PELLET GROUP DATA --
Management unit 16C, Study no: 33

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	-	11	5
Elk	-	-	-
Deer	42	43	7
Cattle	2	3	3

Days use per acre (ha)	
'99	'04
-	-
-	-
22 (54)	4 (10)
17 (42)	3 (7)

BROWSE CHARACTERISTICS --
Management unit 16C, Study no: 33

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	20	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Artemisia spinescens												
94	**20**	-	-	20	-	-	0	0	0	-	0	-/-
99	**140**	-	-	60	80	-	0	0	57	-	0	3/7
04	**0**	-	-	-	-	60	0	0	0	-	0	4/9
Artemisia tridentata wyomingensis												
94	**2860**	100	220	1720	920	1000	31	38	32	20	23	11/20
99	**3480**	180	880	1840	760	960	42	30	22	7	7	12/20
04	**1100**	240	-	660	440	1820	53	7	40	27	27	19/35

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Atriplex canescens												
94	**0**	-	-	-	-	-	0	0	-	-	0	8/17
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	17/30
Atriplex confertifolia												
94	**2700**	20	80	2100	520	80	20	7	19	8	9	8/16
99	**2540**	320	620	1100	820	160	16	9	32	16	18	8/16
04	**1660**	-	-	1480	180	280	4	0	11	6	6	10/19
Ceratoides lanata												
94	**80**	-	-	60	20	-	0	25	25	-	0	6/11
99	**160**	20	-	160	-	-	13	0	0	-	0	5/9
04	**80**	20	-	80	-	-	25	25	0	-	0	13/18
Chrysothamnus nauseosus												
94	**60**	-	20	40	-	-	0	33	-	-	0	9/7
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Chrysothamnus viscidiflorus stenophyllus												
94	**60**	-	-	60	-	-	0	0	-	-	0	8/9
99	**160**	-	20	140	-	20	0	0	-	-	0	6/12
04	**0**	-	-	-	-	-	0	0	-	-	0	10/12
Eriogonum microthecum												
94	**20**	20	-	20	-	-	0	0	-	-	0	2/3
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Gutierrezia sarothrae												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	8/6
Juniperus osteosperma												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	20	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	20	0	0	-	-	0	-/-
Leptodactylon pungens												
94	**140**	20	20	120	-	-	0	0	-	-	0	7/10
99	**240**	-	-	240	-	-	0	0	-	-	0	5/7
04	**0**	-	-	-	-	60	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Opuntia polyacantha												
94	**1120**	-	40	1060	20	-	0	0	2	-	0	4/17
99	**1080**	160	80	800	200	-	0	0	19	9	15	4/18
04	**1020**	-	20	640	360	160	0	0	35	27	31	5/14
Sarcobatus vermiculatus												
94	**20**	-	-	20	-	-	0	0	-	-	0	16/21
99	**20**	-	-	20	-	-	100	0	-	-	0	16/23
04	**20**	-	-	20	-	-	100	0	-	-	0	27/33
Sclerocactus												
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**80**	20	20	60	-	-	0	0	-	-	0	2/2
04	**40**	-	-	40	-	-	0	0	-	-	0	2/4
Tetradymia spinosa												
94	**0**	-	-	-	-	-	0	0	-	-	0	12/25
99	**60**	-	-	60	-	-	0	0	-	-	0	3/7
04	**0**	-	-	-	-	-	0	0	-	-	0	15/22